FIG.1

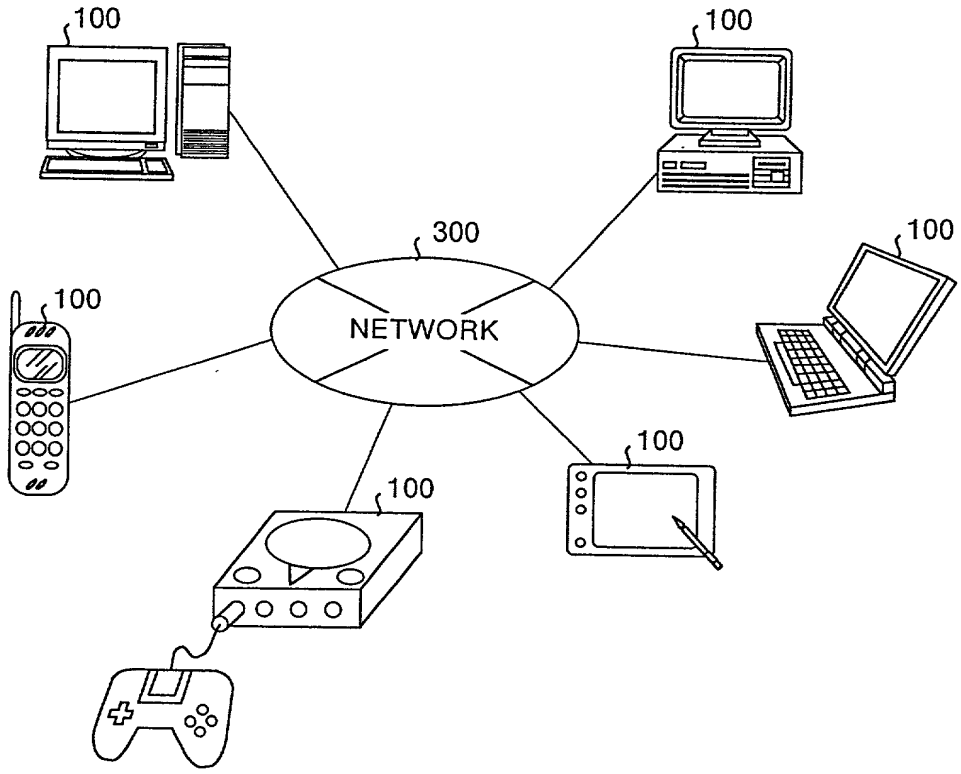


FIG.2

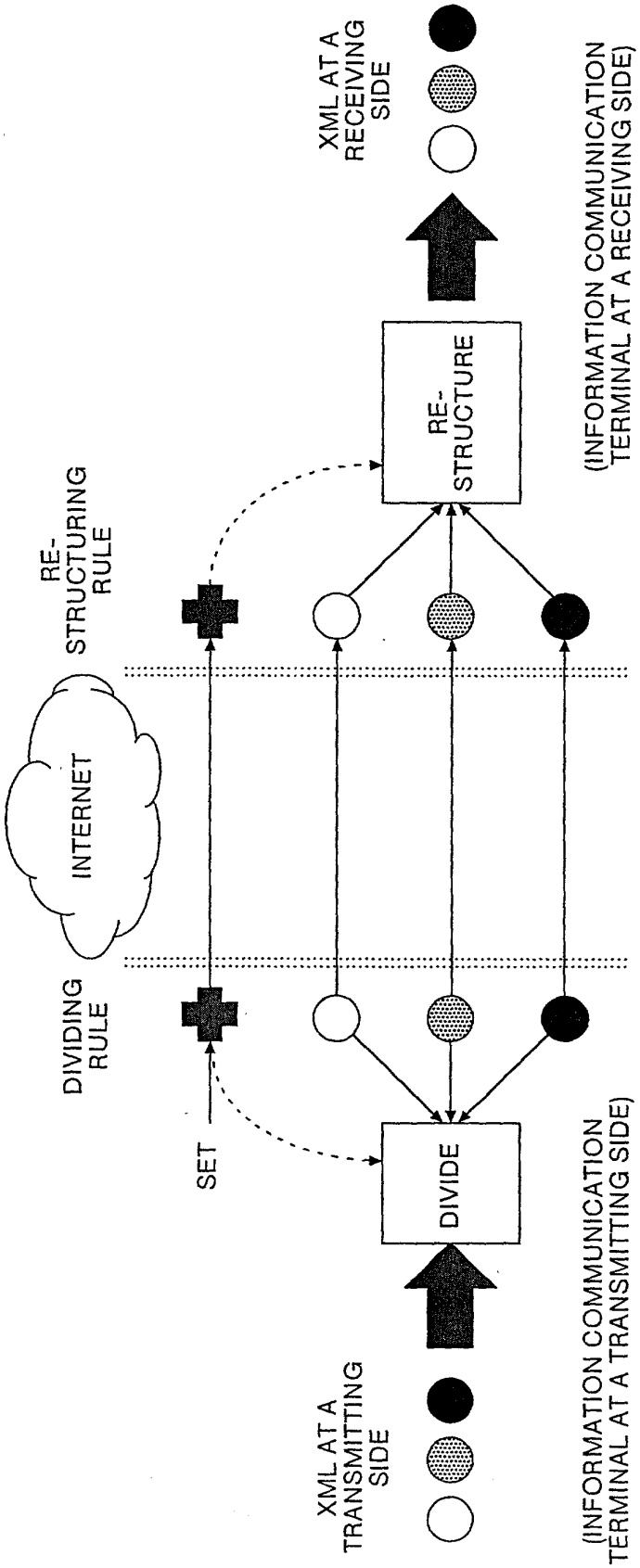
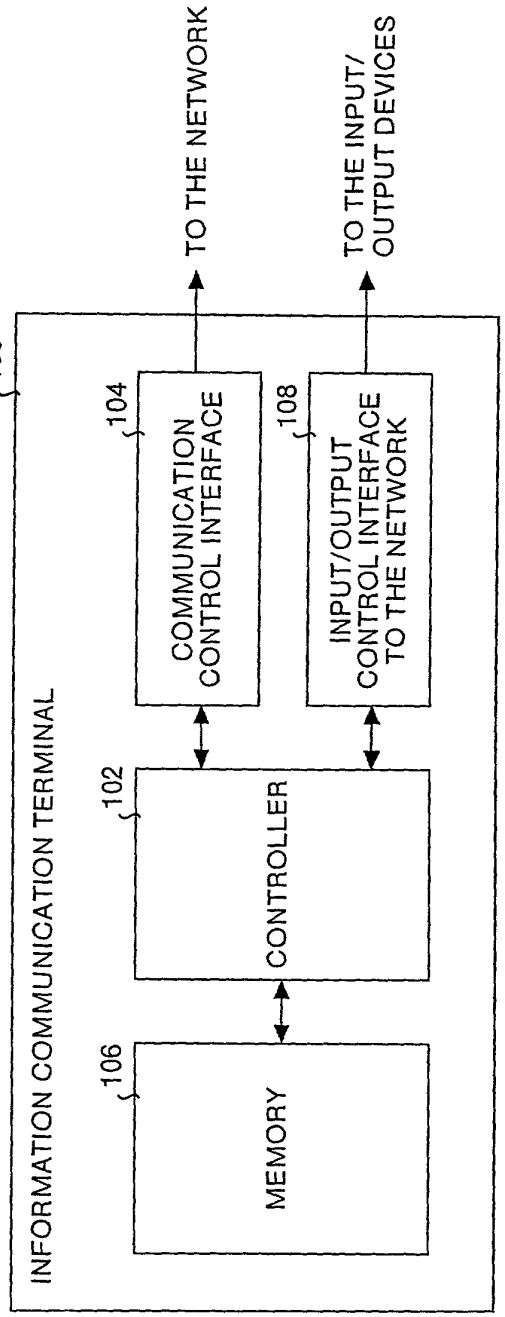

XML AT A RECEIVING SIDE
RE-STRUCTURE
(INFORMATION COMMUNICATION TERMINAL AT A RECEIVING SIDE)
RE-STRUCTURING RULE
INTERNET
DIVIDING RULE
SET
DIVIDE
XML AT A TRANSMITTING SIDE
(INFORMATION COMMUNICATION TERMINAL AT A TRANSMITTING SIDE)

FIG.3


INFORMATION COMMUNICATION TERMINAL
100
MEMORY
106
CONTROLLER
102
COMMUNICATION CONTROL INTERFACE
104
INPUT/OUTPUT CONTROL INTERFACE TO THE NETWORK
108
TO THE NETWORK
TO THE INPUT/ OUTPUT DEVICES

TITLE: INFORMATION EXCHANGING SYSTEM, INFORMATION COMMUNICATION TERMINAL, INFORMATION EXCHANGING METHOD, AND COMPUTER PRODUCT
Inventor: Minoru IKEDA
Docket No. 4554-005

FIG.4

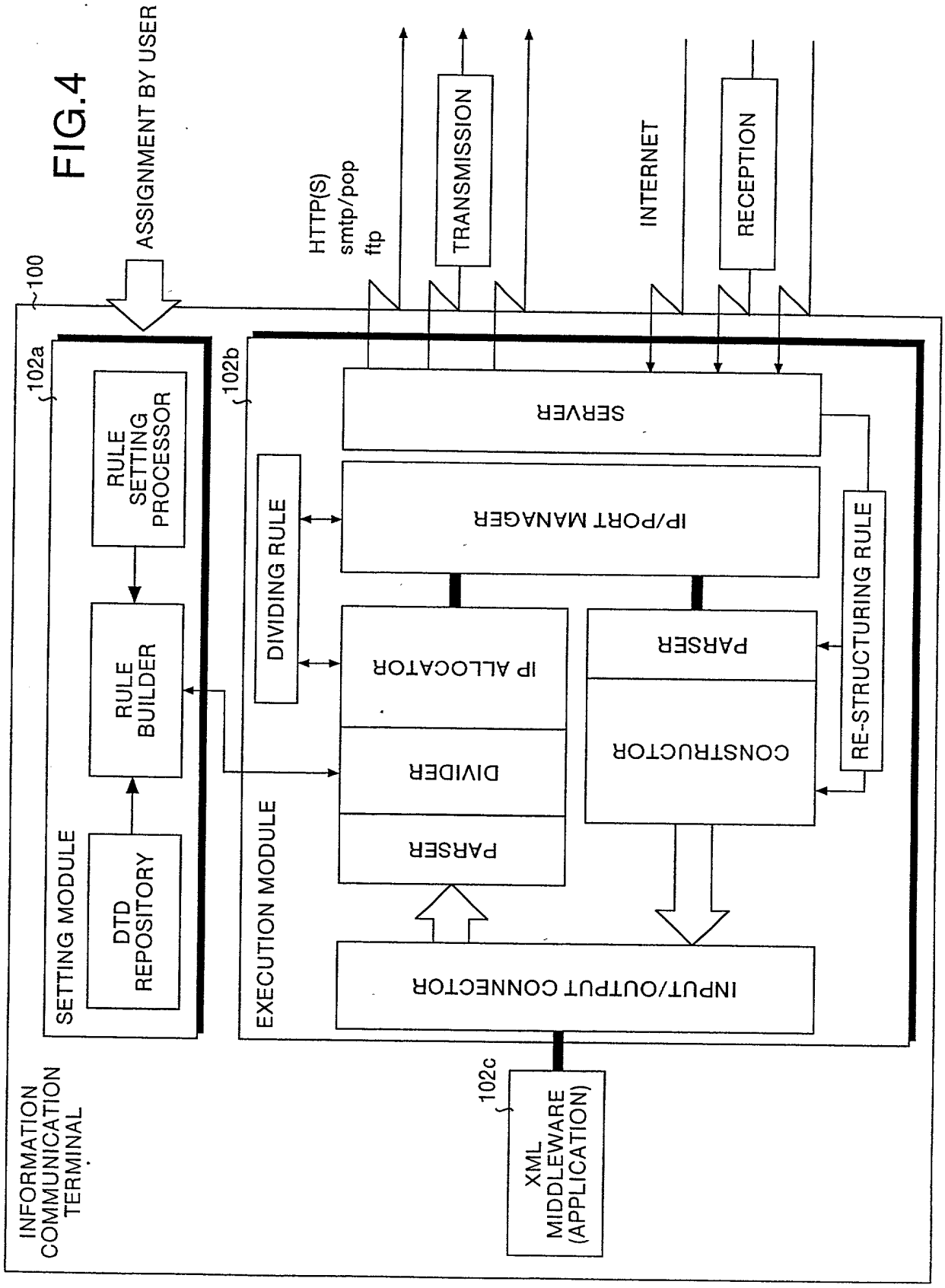


FIG.5

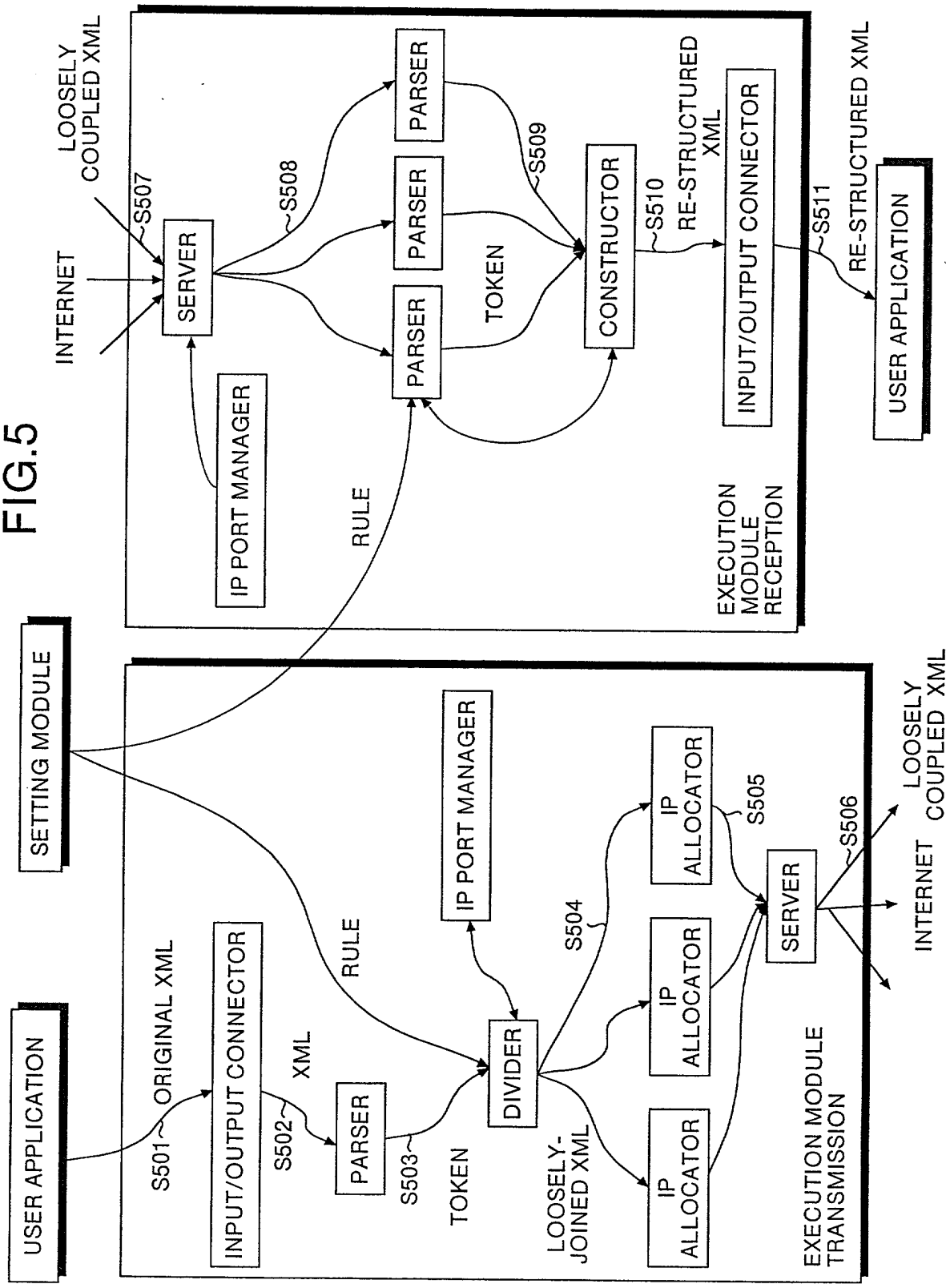

USER APPLICATION
ORIGINAL XML
S501
INPUT/OUTPUT CONNECTOR
XML
S502
PARSER
S503
TOKEN
SETTING MODULE
RULE
IP PORT MANAGER
DIVIDER
LOOSELY-JOINED XML
S504
IP ALLOCATOR
IP ALLOCATOR
IP ALLOCATOR
S505
SERVER
S506
EXECUTION MODULE TRANSMISSION
LOOSELY COUPLED XML
INTERNET
LOOSELY COUPLED XML
INTERNET
S507
SERVER
S508
PARSER
PARSER
PARSER
TOKEN
S509
CONSTRUCTOR
S510
RE-STRUCTURED XML
INPUT/OUTPUT CONNECTOR
S511
RE-STRUCTURED XML
USER APPLICATION
IP PORT MANAGER
RULE
EXECUTION MODULE RECEPTION

FIG.6

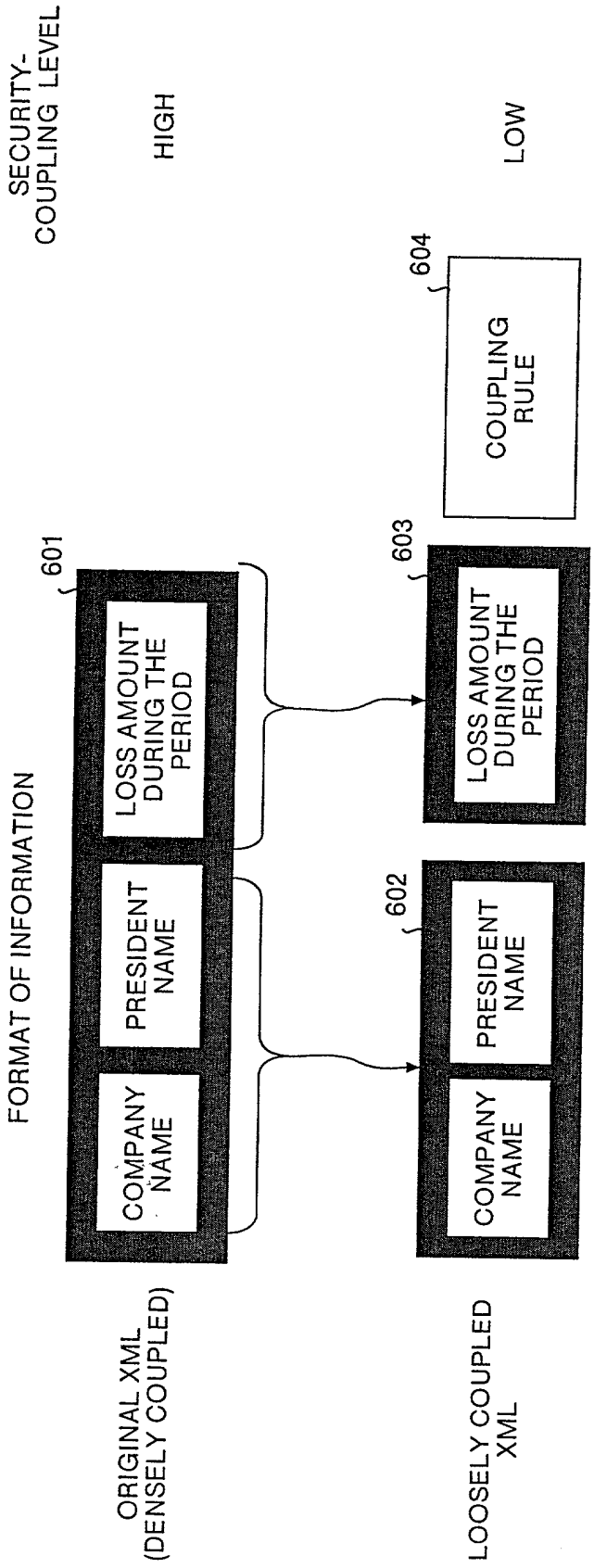

SECURITY-COUPLING LEVEL
HIGH
LOW
FORMAT OF INFORMATION
601
COMPANY NAME
PRESIDENT NAME
LOSS AMOUNT DURING THE PERIOD
ORIGINAL XML (DENSELY COUPLED)
602
COMPANY NAME
PRESIDENT NAME
603
LOSS AMOUNT DURING THE PERIOD
LOOSELY COUPLED XML
604
COUPLING RULE

FIG.7

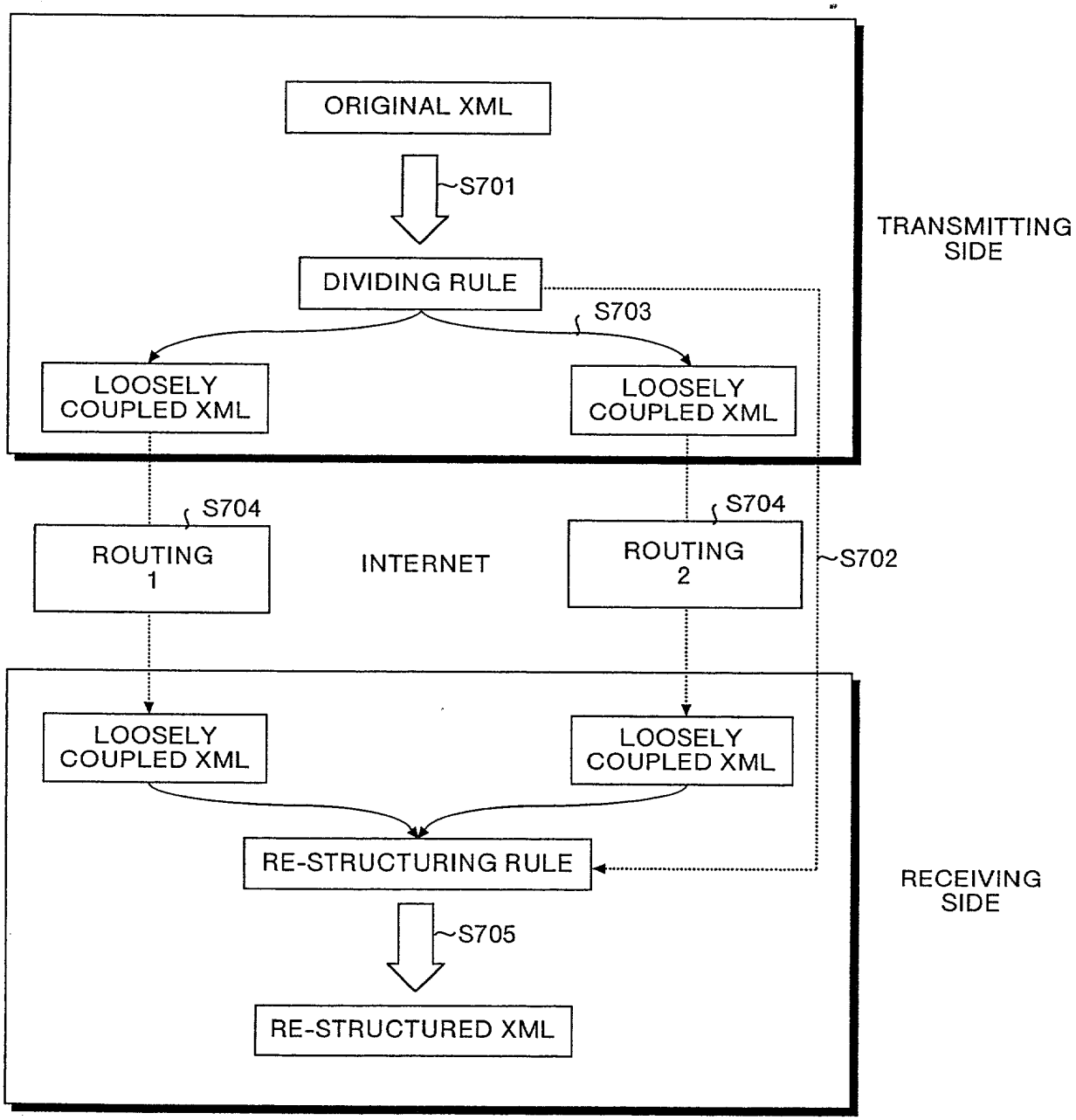

ORIGINAL XML
S701
DIVIDING RULE
S703
LOOSELY COUPLED XML
LOOSELY COUPLED XML
TRANSMITTING SIDE
S704
ROUTING 1
INTERNET
S704
ROUTING 2
S702
LOOSELY COUPLED XML
LOOSELY COUPLED XML
RE-STRUCTURING RULE
S705
RE-STRUCTURED XML
RECEIVING SIDE

FIG.8

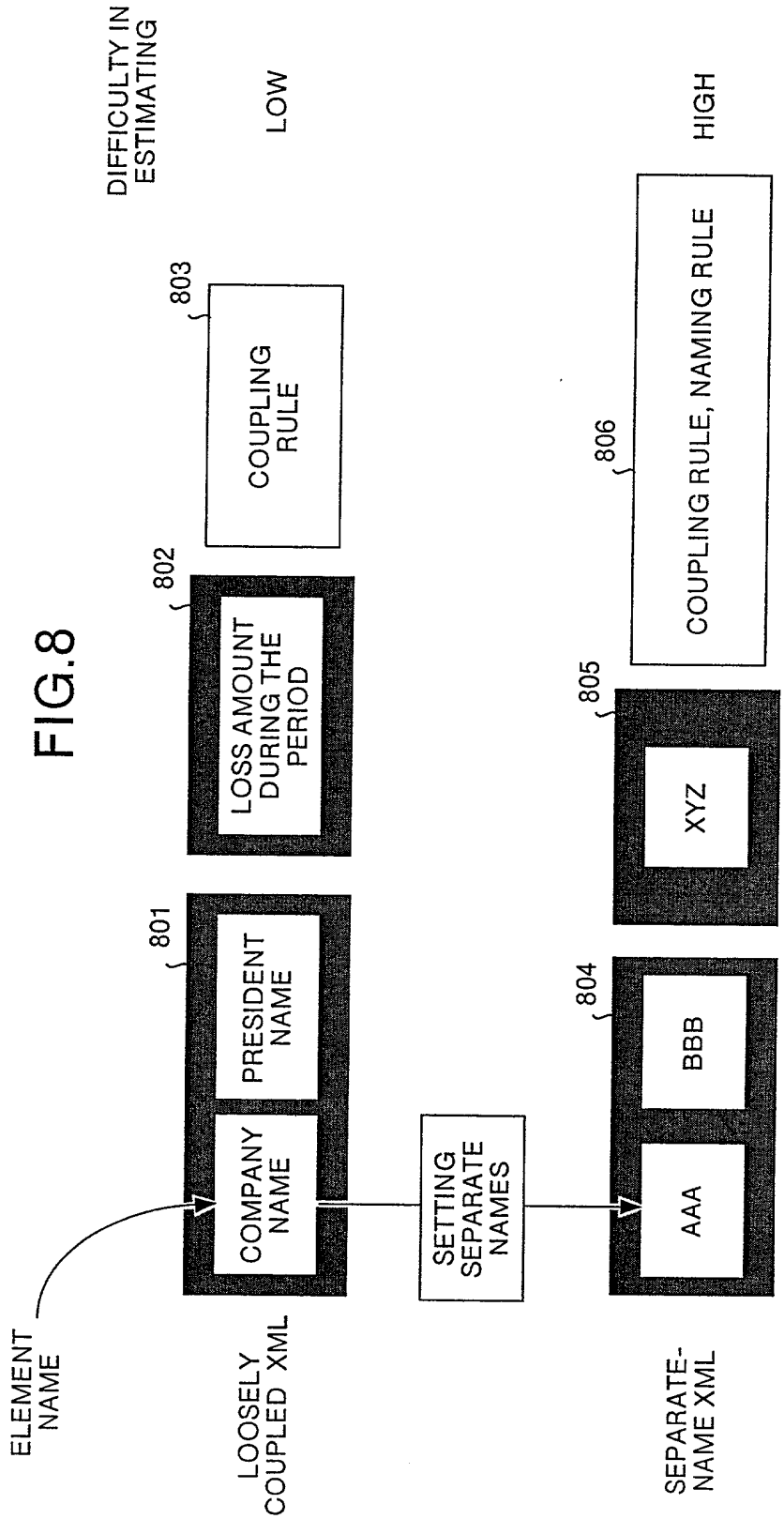
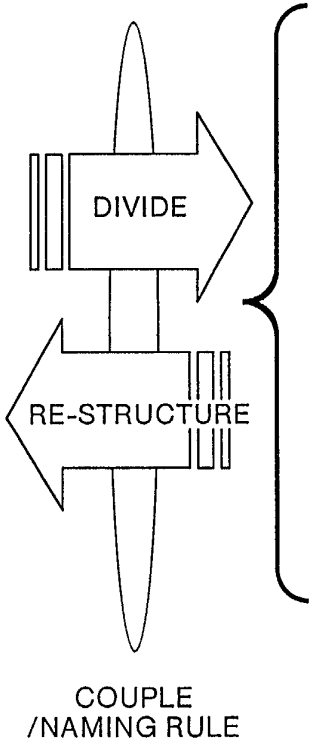

DIFFICULTY IN ESTIMATING
LOW
HIGH
803
COUPLING RULE
802
LOSS AMOUNT DURING THE PERIOD
806
COUPLING RULE, NAMING RULE
801
PRESIDENT NAME
805
XYZ
COMPANY NAME
SETTING SEPARATE NAMES
804
BBB
AAA
ELEMENT NAME
LOOSELY COUPLED XML
SEPARATE-NAME XML

FIG.9

ORIGINAL XML 901

```
< ? xml version= "1.0" encoding="Shift_JIS"?>
<CORPORATE INFORMATION>
  <COMPANY>
      <COMPANY NAME>XX COMPANY
      LIMITED</COMPANY NAME>
      <LOCATION>TOKYO</LOCATION>
      <LOSS DURING THE PERIOD>20000
      </LOSS DURING THE PERIOD>
  </COMPANY>
  <COMPANY>
      <COMPANY NAME>
      EAST & WEST COMPANY LIMITED
      </COMPANY NAME>
      <LOCATION>OSAKA</LOCATION>
      <LOSS DURING THE PERIOD>32000
      </LOSS DURING THE PERIOD>
  </COMPANY>
  <COMPANY>
      <COMPANY NAME>
      SOUTH & NORTH COMPANY
      LIMITED</COMPANY NAME>
      <LOCATION>KYUSHU
      </LOCATION>
      <LOSS DURING THE PERIOD>0
      </LOSS DURING THE PERIOD>
  </COMPANY>
  <COMPANY>
      <COMPANY NAME>
      UP & DOWN COMPANY LIMITED
      </COMPANY NAME>
      <LOCATION>HOKKAIDO
      </LOCATION>
      <LOSS DURING THE PERIOD>21000
      </LOSS DURING THE PERIOD>
  </COMPANY>
</CORPORATE INFORMATION>
```



LOOSELY COUPLED XML 902

```
< ? xml version= "1.0" encoding="Shift_JIS"?>
<AA>
  <XX>
      <YY>XX COMPANY LIMITED<
      /YY>
      <ZZ>TOKYO</ZZ>
  </XX>
  <XX>
      <YY>EAST & WEST COMPANY
      LIMITED</YY>
      <ZZ>OSAKA</ZZ>
  </XX>
  <XX>
      <YY>SOUTH & NORTH COMPANY
      LIMITED</YY>
      <ZZ>KYUSHU</ZZ>
  </XX>
  <XX>
      <YY>UP & DOWN COMPANY
      LIMITED</YY>
      <ZZ>HOKKAIDO</ZZ>
  </XX>
</AA>
```

903

```
< ? xml version= "1.0" encoding="Shift_JIS"?>
<12>
  <34>
      <100>20000</100>
  </34>
  <34>
      <100>32000</100>
  </34>
  <34>
      <100>0</100>
  </34>
  <34>
      <100>21000</100>
  <34>
</12>
```

FIG.10

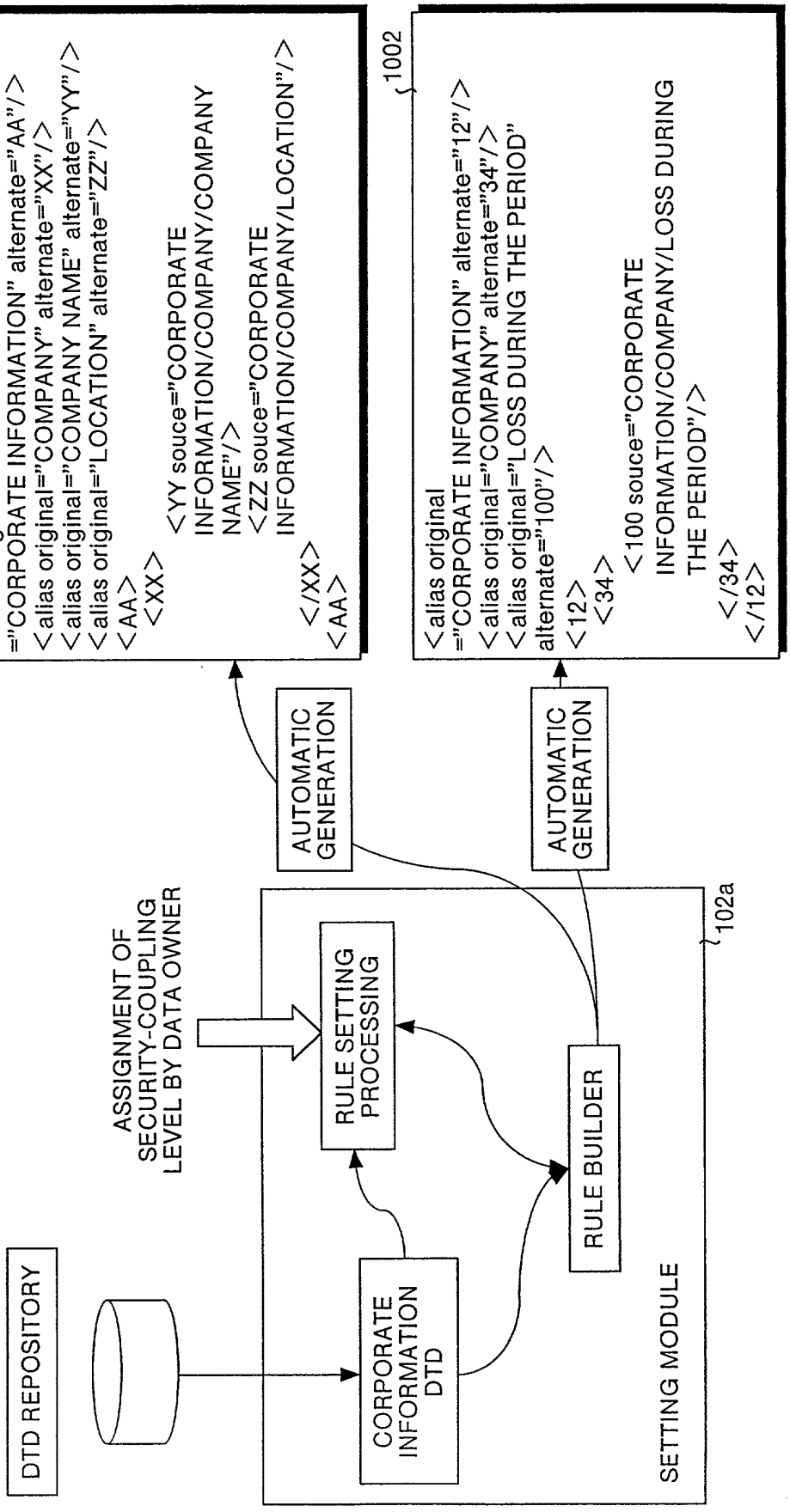

COUPLING RULE EXAMPLE (XML)
1001
<alias original
="CORPORATE INFORMATION" alternate="AA"/>
<alias original="COMPANY" alternate="XX"/>
<alias original="COMPANY NAME" alternate="YY"/>
<alias original="LOCATION" alternate="ZZ"/>
<AA>
<XX>
<YY souce="CORPORATE
INFORMATION/COMPANY/COMPANY
NAME"/>
<ZZ souce="CORPORATE
INFORMATION/COMPANY/LOCATION"/>
</XX>
<AA>
1002
<alias original
="CORPORATE INFORMATION" alternate="12"/>
<alias original="COMPANY" alternate="34"/>
<alias original="LOSS DURING THE PERIOD"
alternate="100"/>
<12>
<34>
<100 souce="CORPORATE
INFORMATION/COMPANY/LOSS DURING
THE PERIOD"/>
</34>
</12>
AUTOMATIC GENERATION
AUTOMATIC GENERATION
ASSIGNMENT OF SECURITY-COUPLING LEVEL BY DATA OWNER
DTD REPOSITORY
RULE SETTING PROCESSING
RULE BUILDER
CORPORATE INFORMATION DTD
SETTING MODULE
102a

FIG.11

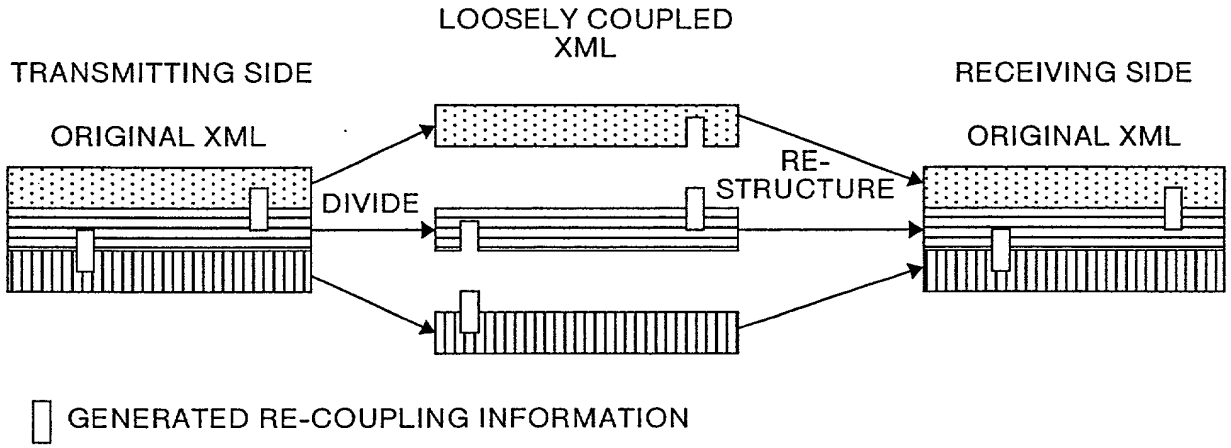


FIG.12

ORIGINAL XML

```
<my-card>
  <card-no>12346789799</card-no>      ---CARD NUMBER
<password>2345</password>      ----PASSWORD
  <expiored>2004/01/01</expiored>   ---VALIDITY
</my-card>
```

FIG.13

DIVIDING / RE-STRUCTURING RULE

```
<declare variable="@num" binding="abc/zzz:xyz/hed:mix/ifs"/>
<abc>
<xxx source="my-card/card-no"/>
        <zzz source="@num=@random(@timeday)"/>
</abc>
<xyz>
        <123 source="my-card/password"/>
        <hed source="@num"/>
</xyz>
<mix>
        <dsn source="my-card/ expired "/>
        <ifs source="@num"/>
</mix>
```

FIG.14

LOOSELY-JOINED XML DATA

```
<abc>
  <xxx>12346789799</xxx>          ---CARD NUMBER
  <zzz>gj56a02j</zzz>          --- GENERATED MEDIATION KEY
</abc>
```

```
<xyz>
  <123>2345</123>          ----PASSWORD
  <hed>gj56a02j</hed>          ---MEDIATION KEY
</xyz>
```

```
<mix>
   <dsn>2004/01/01</dsn>       ---VALIDITY
   <ifs>gj56a02j</ifs>          ---MEDIATION KEY
</mix>
```

FIG.15

```
<buffer>
<binding></binding>      MEDIATION KEY FOR COUPLING
<my-card>
  <card-no></card-no>      ---CARD NUMBER
  <password></password>      ----PASSWORD
  <expired></expired>   ---VALIDITY
</my-card>
</buffer>
```

FIG.16

INITIAL STATUS OF BUFFER

```
<buffer>
<binding> </binding>
<my-card>
  <card-no></card-no>      ---CARD NUMBER
  <password></password>      ----PASSWORD
  <expired></expired>   ---VALIDITY
</my-card>
</buffer>
```

FIG.17

ORIGINAL XML DATA OF CARD NUMBER

```
<abc>
  <xxx>12346789799</xxx>          ---CARD NUMBER
  <zzz>gj56a02j</zzz>          --- GENERATED MEDIATION KEY
(RANDOM NUMBER AND THE LIKE)
 </abc>
```

FIG.18

SET DATA TO CORRESPONDING
CARD NUMBER ELEMENT IN BUFFER

```
<buffer>
<binding> gj56a02j </binding>
<my-card>
  <card-no>12346789799</card-no>      ---CARD NUMBER
  <password></password>      ----PASSWORD
  <expired></expired>   ---VALIDITY
</my-card>
</buffer>
```

FIG.19

SET DATA TO ALL ELEMENTS

```
<buffer>
<binding> gj56a02j </binding>
<my-card>
  <card-no>12346789799</card-no>      ---CARD NUMBER
  <password>2345</password>      ----PASSWORD
  <expired>2004/01/01</expired>   ---VALIDITY
</my-card>
</buffer>
```